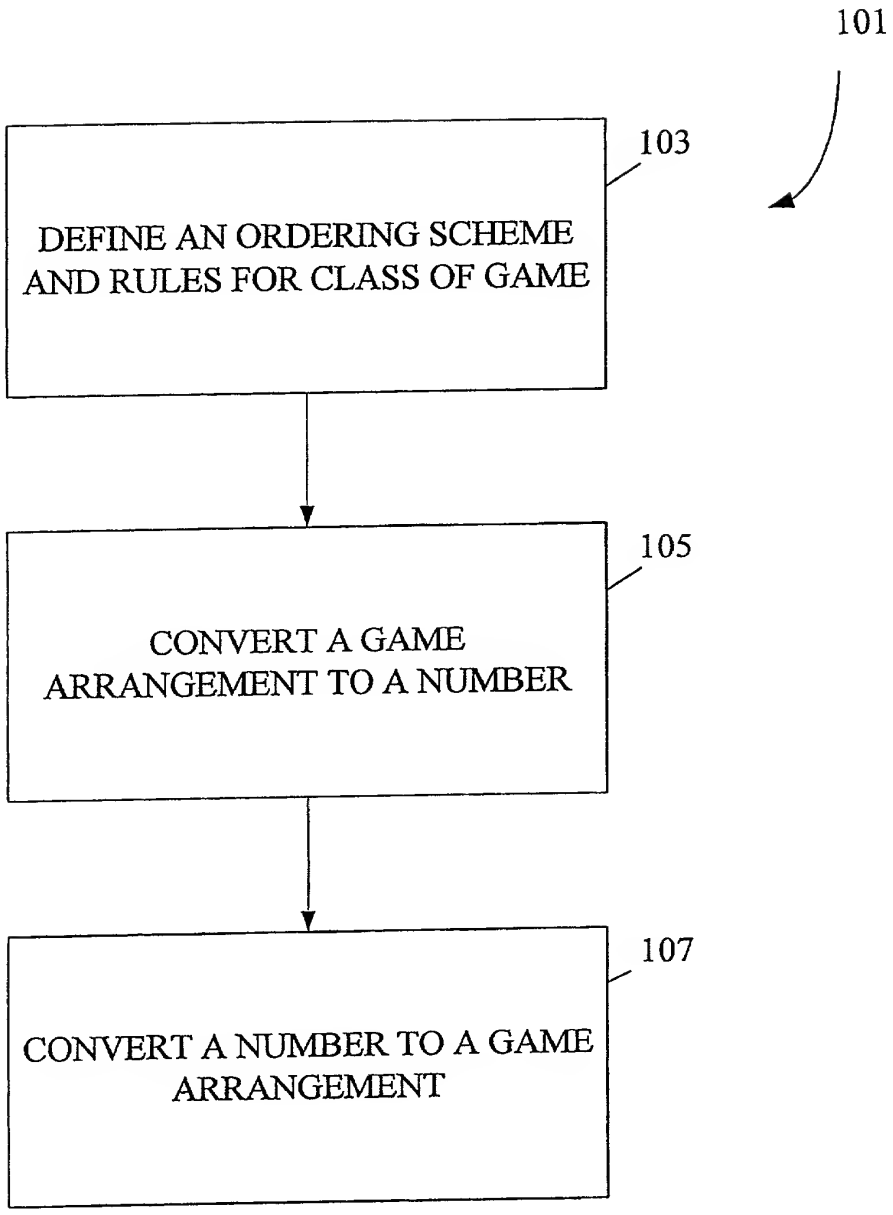
101
103
DEFINE AN ORDERING SCHEME AND RULES FOR CLASS OF GAME
105
CONVERT A GAME ARRANGEMENT TO A NUMBER
107
CONVERT A NUMBER TO A GAME ARRANGEMENT

Figure 1

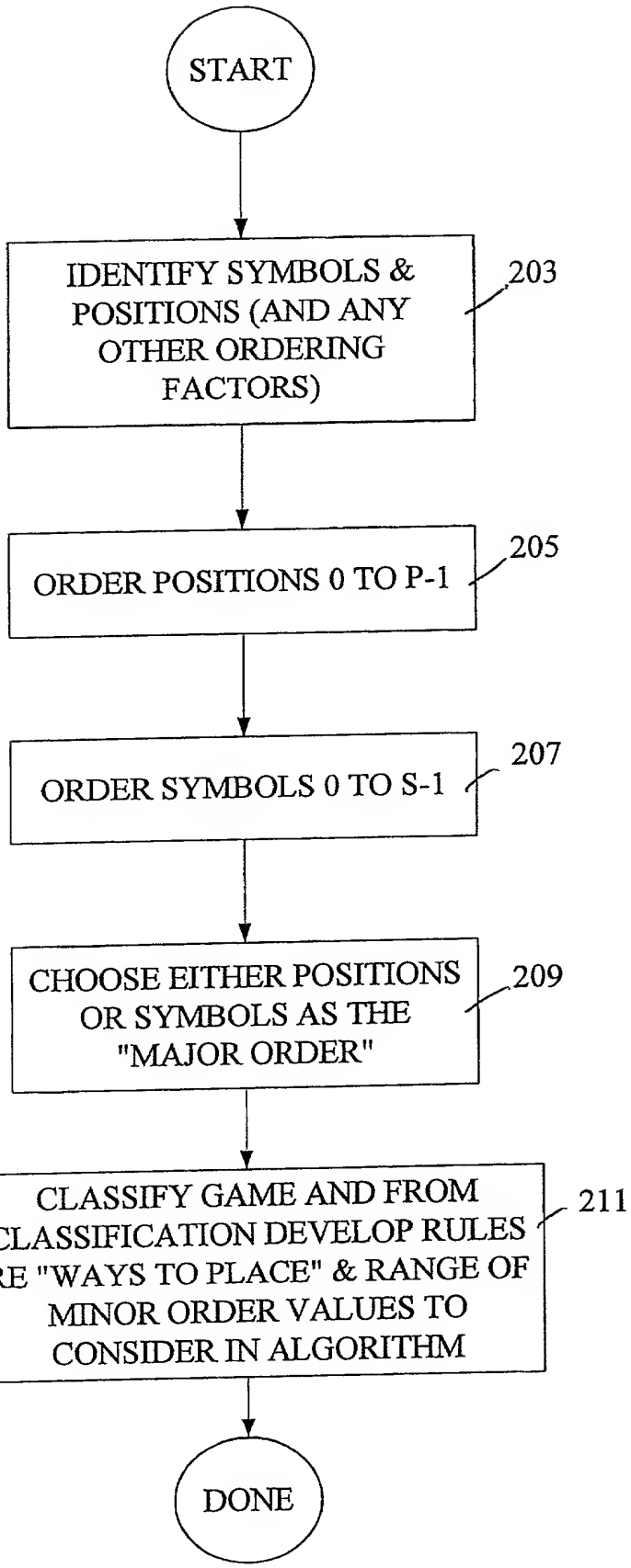

Figure 2

Patent 5,595,389

2h	3h	4h	5h	6h
2h	3h	4h	5h	7h
2h	3h	4h	5h	8h
		.		
		.		
		.		
2h	3h	4h	5h	Ah
2h	3h	4h	6h	7h
2h	3h	4h	6h	8h
		.		
		.		
		.		
3h	4h	5h	6h	7h
3h	4h	5h	6h	8h
		.		
		.		
		.		
9s	10s	Js	Qs	Ks
9s	10s	Js	Qs	As
		.		
		.		
		.		
10s	Js	Qs	Ks	As

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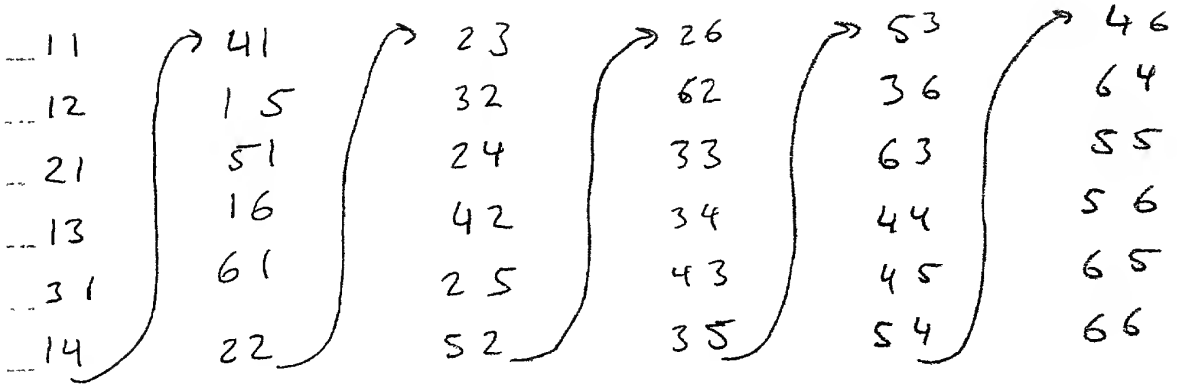
Figure 3

Symbols as Major Order (Two Dice)



Position as Major Order (Two Dice)

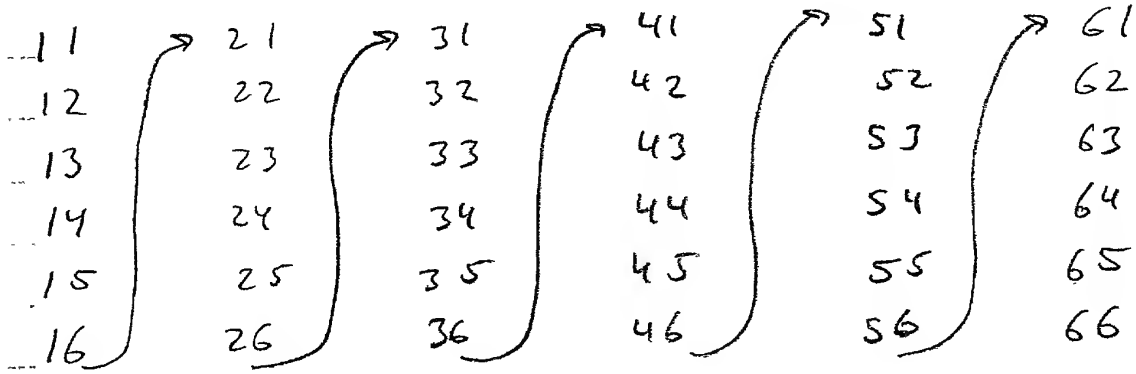


Figure 4

4005496.20501

Poker hand under Consideration: 3H KH 2D 7C 4S

number skipped over at position P=0

2H	3H	4H	5H	6H
2H	3H	4H	5H	7H
⋮				
2H	10S	JS	QS	KS
2H	JS	QS	KS	AS
3H	4H	5H	6H	7H
3H	4H	5H	6H	8H
⋮				
3H	4H	JS	QS	KS
3H	4H	QS	KS	AS
3H	5H	6H	7H	8H
3H	5H	6H	7H	9H
⋮				
3H	QH	JS	QS	KS
3H	QH	QS	KS	AS
3H	KH	AH	2D	3D
3H	KH	AH	2D	4D
⋮				
10S	JS	QS	KS	AS

Ways to place 3H 4H ...

number skipped over at position P=1

Figure 5

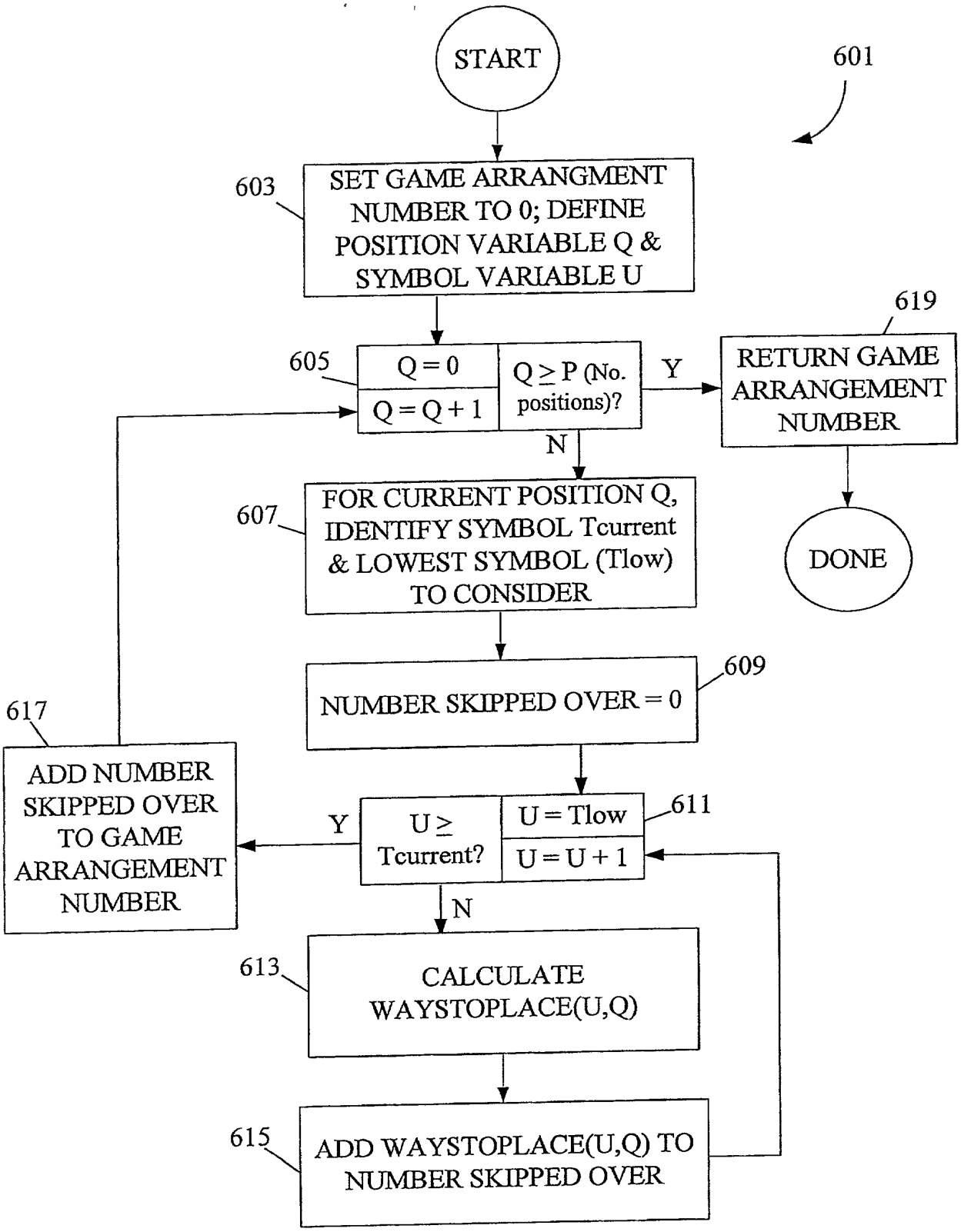

START
601
603
SET GAME ARRANGMENT NUMBER TO 0; DEFINE POSITION VARIABLE Q & SYMBOL VARIABLE U
619
605
Q = 0
Q = Q + 1
Q ≥ P (No. positions)?
Y
RETURN GAME ARRANGEMENT NUMBER
N
607
FOR CURRENT POSITION Q, IDENTIFY SYMBOL Tcurrent & LOWEST SYMBOL (Tlow) TO CONSIDER
DONE
609
NUMBER SKIPPED OVER = 0
617
ADD NUMBER SKIPPED OVER TO GAME ARRANGEMENT NUMBER
Y
U ≥ Tcurrent?
U = Tlow
U = U + 1
611
N
613
CALCULATE WAYSTOPLACE(U,Q)
615
ADD WAYSTOPLACE(U,Q) TO NUMBER SKIPPED OVER

Figure 6

Convert KH, 7C, 4S, 8D, 3H to a number

order the cards! → 3H, kH, 8D, 7C, 4S

Start w/ # = 0

register Q = 0

Symbol T = 1 (3H) 3H ---

V = 0 (2H)

compute # of ways to have 2H ---- (choose(52-0-1, 5-0-1))

= 249,900

= 0 + 249,900 = 249,900

Position Q = 1, Symbol $T_{current}$ = (1 throw = 4H kH ---

V = 2 (4H)

Compute # of ways to place 3H 4H ---

= 18,424

= 249,900 + 18,424 = 268,324

V = 3 (5H)

Compute ways to Place (3H 5H ---) = 17,296

= 268,324 + 17,296 = 285,620

V = 4 (6H)

Compute ways To Place (3H 6H ---) = 16,215

= # + 16,215 = 301,835

V = 5 (7H)

Compute ways to Place (3H 7H ---) = 15180

= # + 15180 = 317,015

V = 6 (8H)

Compute ways to Place (3H 8H ---) = 14,190

= # + 14,190 = 331,205

V = 7 (9H)

Compute ways to Place (3H 9H ---) = 13,244

= # + 13,244 = 344,449

V = 8 (10H)

Compute ways To Place (3H 10H ---) = 12,341

= # + 12,341 = 356,790

Figure 7 over →

V=9 (JH)
compute ways to Place (3H 5H ---) = 11,480
# = # + 11,480 = 368,270
V=10 (QH)
compute ways to Place (3H QH --) = 10,660
# = # + 10,660 = 378,930
V=11 (KH) This is over symbol T, being considered. Stop the B.Z. loop & go to the next position.
Position Q=2, symbol T = 19 (8D)

---

skipped over by 3H (by placing this card) = ways to place (2H ----)

skipped over by 3H KH --- (placing this card)
= ways to Place (3H 4H ---)
+ ways to Place (3H 5H ---)
+ (3H 6H ---)
+ (3H 7H ---)
+ (3H 8H ---)
+ (3H 9H ---)
+ (3H 10H ---)
+ (3H QH ---)

Skipped over by (3H KH 8D ...)
= ways to place (3H KH AH ...)
+ " (3H KH 2D
+ " (3H KH 3D
+ " (3H KH 4D
⋮
+ " 7D

F.gure 7
(Continued)

	Position Dependent	Position Independent
with Replacement	exp (X, Y) $0 \leq U < T_{curr}$ $T_{low} = 0$	C (X, Y) $T_{prev} \leq U < T_{curr}$ $T_{low} = T_{prev}$
without Replacement	P (X, Y) $0 \leq U < T_{curr}$ (excluding previously used values) $T_{low} = 0$	C (X, Y) $T_{prev} < U < T_{curr}$ $T_{low} = T_{prev} + 1$

Figure 8

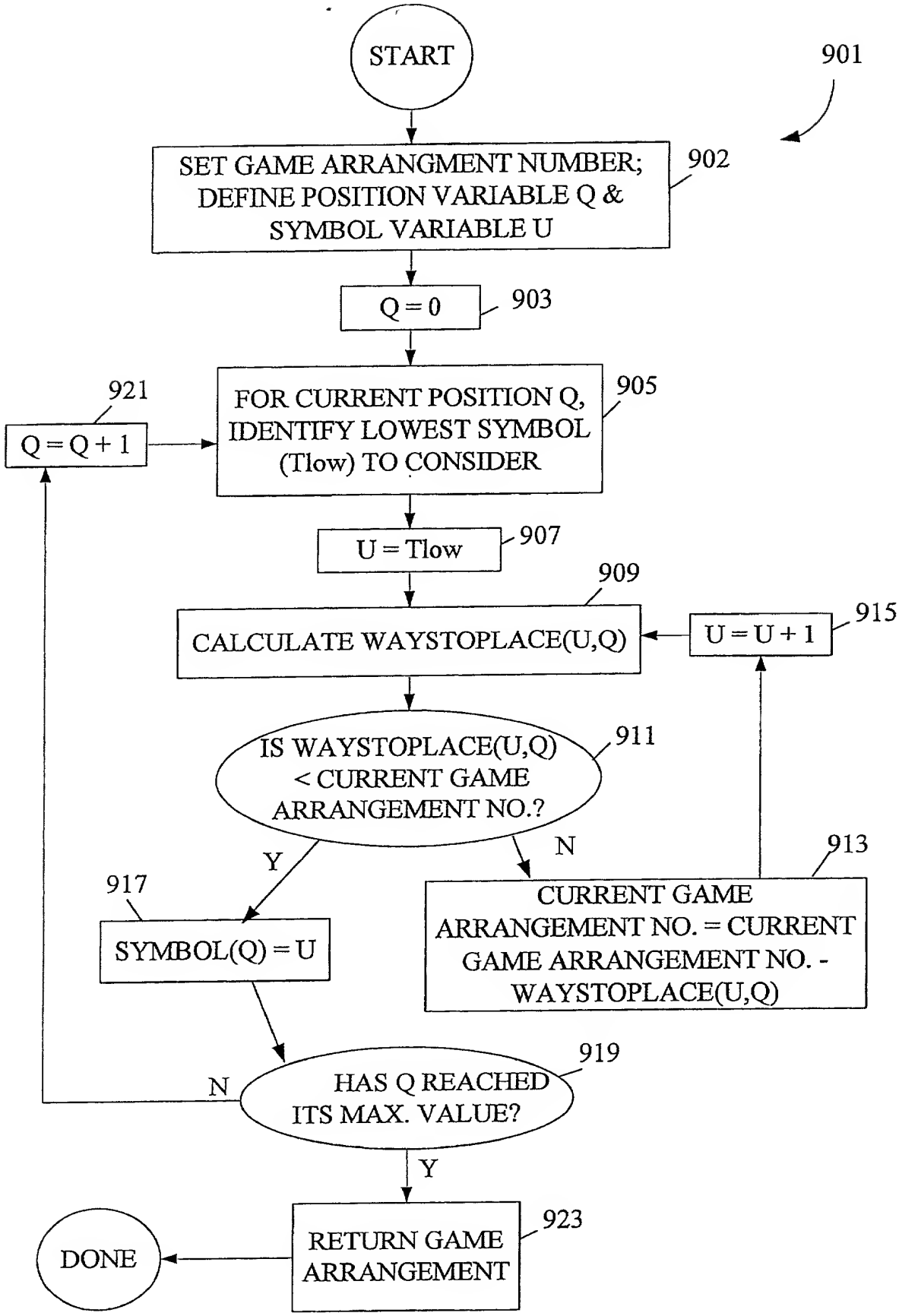

START
901
SET GAME ARRANGMENT NUMBER; DEFINE POSITION VARIABLE Q & SYMBOL VARIABLE U
902
Q = 0
903
FOR CURRENT POSITION Q, IDENTIFY LOWEST SYMBOL (Tlow) TO CONSIDER
905
921
Q = Q + 1
U = Tlow
907
909
CALCULATE WAYSTOPLACE(U,Q)
915
U = U + 1
IS WAYSTOPLACE(U,Q) < CURRENT GAME ARRANGEMENT NO.?
911
Y
N
913
917
SYMBOL(Q) = U
CURRENT GAME ARRANGEMENT NO. = CURRENT GAME ARRANGEMENT NO. - WAYSTOPLACE(U,Q)
919
N
HAS Q REACHED ITS MAX. VALUE?
Y
923
DONE
RETURN GAME ARRANGEMENT

Figure 9

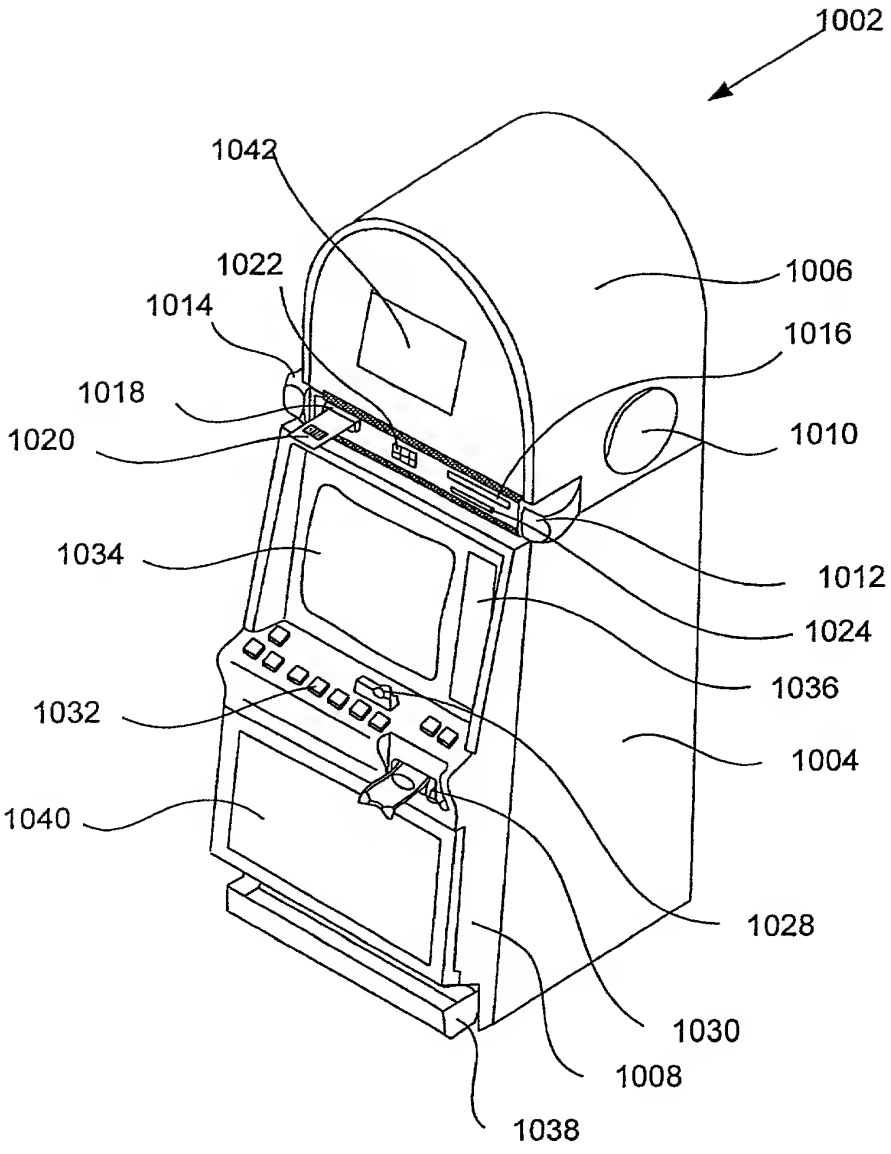
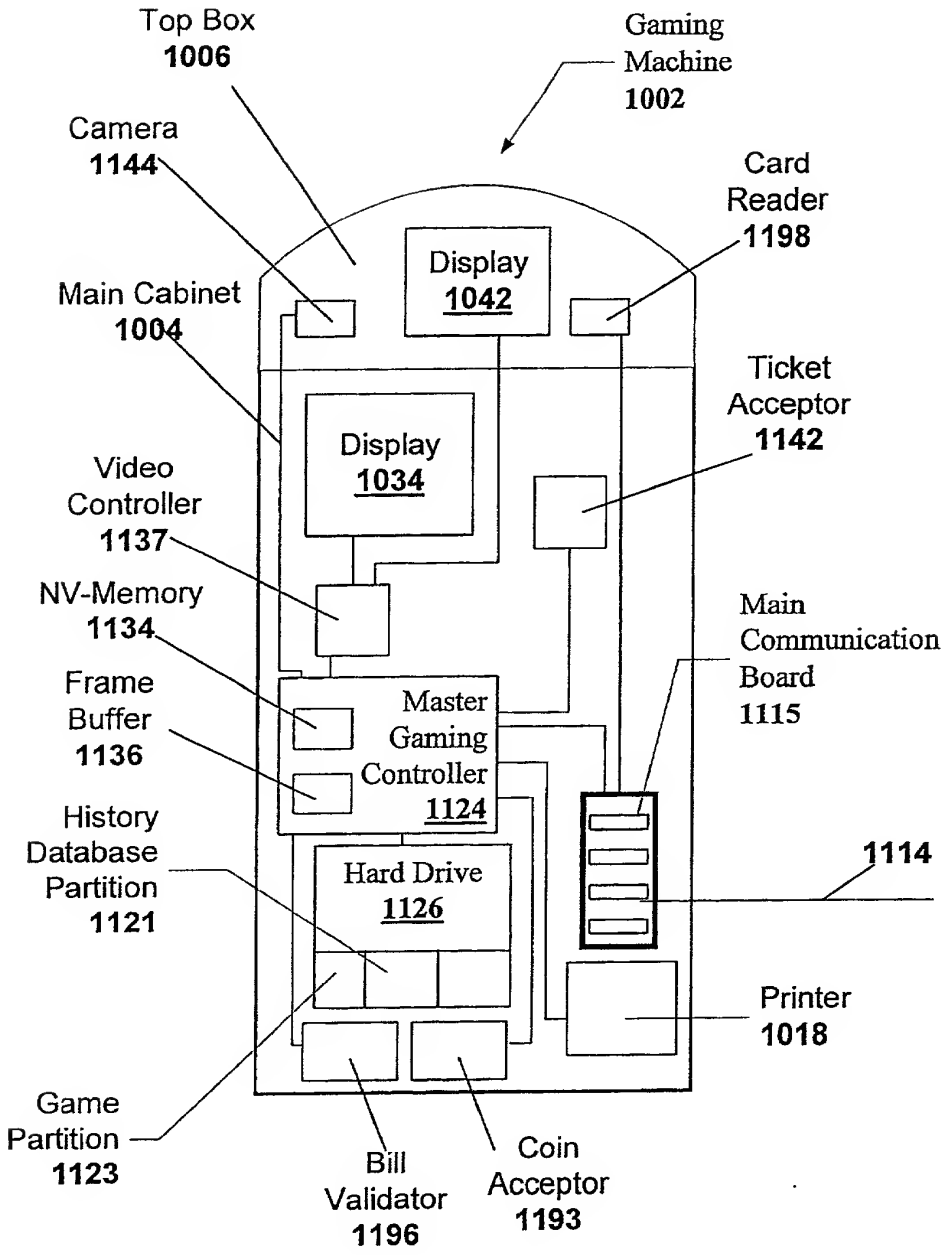

1002
1042
1022
1014
1018
1020
1034
1032
1040
1006
1016
1010
1012
1024
1036
1004
1028
1030
1008
1038

Figure 10

Figure 11


Top Box
1006
Gaming
Machine
1002
Camera
1144
Card
Reader
1198
Display
1042
Main Cabinet
1004
Ticket
Acceptor
1142
Display
1034
Video
Controller
1137
NV-Memory
1134
Main
Communication
Board
1115
Frame
Buffer
1136
Master
Gaming
Controller
1124
History
Database
Partition
1121
1114
Hard Drive
1126
Printer
1018
Game
Partition
1123
Bill
Validator
1196
Coin
Acceptor
1193